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NOTES ON CLIMATOLOGY.

BY

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THE GEOGRAPHICAL DISTRIBUTION OF RELATIVE HUMIDITY.—At the Bradford meeting of the British Association (1900) an important paper on *The Geographical Distribution of Relative Humidity* was presented by E. G. Ravenstein. In view of the fact that the observations of relative humidity as at present carried out at many meteorological stations and on board ship are not very reliable, the author has limited himself to indicating four grades of mean annual humidity, the upper limits of which are respectively 50 per cent. (very dry), 65 per cent., 80 per cent., and 100 per cent. (very damp). The relative humidity over the oceans may exceed 80 per cent., but in certain regions, such as the "horse latitudes," it is much less. Over a portion of the South Pacific it does not exceed 65 per cent. The salinity of the same portion of that ocean is greater than over neighboring regions. Another chart shows the Annual Range of Humidity, *i. e*, the difference between the driest and dampest months of the year. In Great Britain, as in many other parts of the world where the tempering influence of the ocean is marked, the range does not exceed 16 per cent. In the interior of the continents, however, it occasionally exceeds 45 per cent., the spring and summer being exceedingly dry, while the winter is very damp. Thus, at Yarkand, the relative humidity in May is 30 per cent., while it is 84 per cent. in December. By combining temperature and humidity the author divides the earth's surface into sixteen so-called *hygro-thermal* types, which are as follows:

1. Hot (temperature 73° and over) and very damp (humidity 81 per cent. or more)—Batavia, Camaroons, Mombasa.
2. Hot and moderately damp (66–80 per cent.)—Havana, Calcutta.
3. Hot and dry (51–65 per cent.)—Bagdad, Lahore, Khartum.
4. Hot and very dry (50 per cent. or less)—Disa, Wadi Halfa, Kuka.
5. Warm (temperature 58°–72°) and very damp—Walfisch Bay, Arica.
6. Warm and moderately damp—Lisbon, Rome, Damascus, Tokyo, New Orleans.

7. Warm and dry—Cairo, Algiers, Kimberley.

8. Warm and very dry—Mexico, Teheran.

9. Cool (temperature 33°–57°) and very damp—Greenwich, Cochabamba.

10. Cool and moderately damp—Vienna, Melbourne, Toronto, Chicago.

11. Cool and dry—Tashkent, Simla, Cheyenne.

12. Cool and very dry—Yarkand, Denver.

13. Cold (temperature 32° or less) and very damp—Ben Nevis, Sagastyr, Godthaab.

14. Cold and moderately damp—Tomsk, Pike's Peak, Polaris House.

15. Cold and dry—

16. Cold and very dry—Pamir.

FAMINES IN INDIA.—The recent Indian famine, with its appalling loss of life, has naturally led to considerable discussion of questions concerning the causes of these famines, the relief of the poor during such crises, and the possible prevention of famines in the future. One of the most interesting publications which has appeared in this connection is a book entitled *Open Letters to Lord Curzon on Famines and Land Assessments in India*, by Romesh C. Dutt, Lecturer on Indian History at University College, London. While this volume is largely political in its nature, it contains a number of noteworthy facts concerning past famines, their causes, and the loss of life due to them. During a period of 130 years of British rule in India there have been twenty-two famines. The first great famine which attracted the attention of the British nation to this subject was the Bengal famine of 1770, which, like all famines there, was immediately caused by the failure of the monsoon rains, although the intensity of the famine and the great loss of life it caused were partly due to the maladministration of the East India Company, and the consequent impoverishment of the people. It is estimated that over ten millions of people died of this famine. Succeeding famines occurred in 1783, 1784, 1792, 1803, 1804, 1807, 1813, 1823, 1833, 1837, 1854. In 1833, 200,000 persons died in Gantur out of a population of 500,000. In 1837, after a failure of the rains, about 800,000 people died in Northern India of famine. The wars of the Indian Mutiny greatly interfered with cultivation, and a failure of the rains in 1860 was followed by a famine in which about 200,000 people died. The Orissa famine of 1866 resulted in the death of nearly 1,000,000 persons; while the famine of 1869, in Northern India, gave a mortality estimated at 1,200,000. The Madras famine of 1877 caused a loss of life estimated at 5,000,000. The intensity of this famine decreased markedly when the rains commenced. In 1897 a famine visited Northern India, Bengal, Burma, Madras, and Bombay which was more widespread and more intense than any that had occurred up to that time. No reliable figures, it is stated, are yet obtainable as to the loss of life during the present famine. Within the last forty years there have been ten famines in India, and at a moderate computation the loss of life from starvation and from disease brought on by them may be placed at 15,000,000. The immediate cause of famines in India is, in almost every instance, the failure of the rains. This cause must continue to operate, until, as Mr. Dutt says, there is in India a more extensive system of irrigation than has yet been provided. The author goes on to say:

> But the intensity and the frequency of recent famines are greatly due to the resourceless condition and the chronic poverty of the cultivators, caused by the over-assessment of the soil, on which they depend for their living . . . Land revenue is the most important item of the Indian revenues, and so it happens that the taxation falls heavily on the cultivators of the soil, and reduces them to a condition of chronic poverty. They can save nothing in years of good harvest, and consequently every year of drought is a year of famine.

Mr. Dutt points out that in the famines of 1877, 1897, and 1899 the parts of India which were over-assessed suffered most severely. The author's study leads him to the following conclusion:

> There is no doubt these famines are directly caused by the failure of the annual rains, over which man has no control; but it is equally certain that their intensity and their disastrous effects can be to a great extent mitigated by moderating the land tax, by the construction of irrigation works, and by the reduction of the public debt and the expenditure of India.

This condition of things in India furnishes an interesting illustration of the close relations that may exist between man, the climate in which he lives, and the laws by which he is governed.

CLIMATIC CONTROL IN THE DESERT.—A recent article on *Climatic Control in the Desert*, by Mary I. Platt (*Journal of School Geography*, Sept. and Oct., 1900), is very suggestive along the line of human climatology. Miss Platt classifies deserts as *arid* and *ice* deserts, and under each of these heads she considers some of the ways in which the climate of the desert has influenced man. The Sahara is taken as the type of the arid and Greenland as the type of the ice desert. The wonderful adaptation of plant and animal life to the hard conditions in which it finds itself in the arid or ice desert are clearly, though briefly, sketched. Schirmer's classification of the Saharan tribes into Nomads and Sedentaries is adopted. The Nomads camp near towns in winter, and wander with their flocks and herds in summer in search of water and pasturage, while the Sedentaries live throughout the year in towns near oases or near mountains on the edge of the desert. The food, occupations, and commerce in the Sahara are briefly discussed, and the characteristics of the people are shown to be closely affected by the conditions of life imposed upon them by the climate. Miss Platt draws some interesting parallels between the desert of sand and the desert of ice:

> Between the sand desert and the ice desert there are marked similarities and some contrasts. In the ice desert, all the people live on the edge. In the sand desert, nearly all the people live on the edge, near the border mountains or on the edge of the interior mountains. Nearly all the men of Sahara are nomadic, and the Eskimos are also, to a less degree. In Greenland the great enemy is the cold; in Sahara the great enemy is the sand. In Greenland the one great dependence of the natives is the seal, which supplies them with food, clothing, habitation and fuel; in Sahara the one chief source of maintenance is the date palm, which supplies food and wine, fibres for mats, wood for houses. Greenland is a white, desolate waste; Sahara is a gray, desolate waste . . . In both places water is very scarce and has to be carefully treasured; in both places wood also is very scarce and has to be most frugally used. In the one case there is monotonous cold; in the other, monotonous heat. In Greenland the sun is welcomed back after the long night; in Sahara the sun shines with a fierce, relentless glare, and the people hide from it by day, and travel largely by night . . . The people of the north are stolid, easily controlled, and low in physical and mental development. Conditions are too hard, and they have succumbed to them, only existing, not living. The people of the Sahara are alert, active, intelligent and enduring. They have a fighting chance, and so they fight to live, and in the contest are made strong.